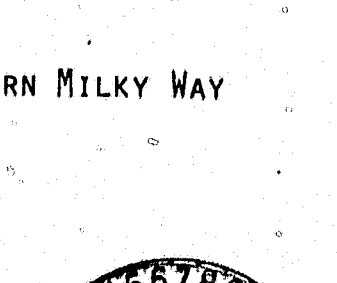
National Space Science Data Center/
World Data Center A For Rockets and Satellites

82-12

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF

LUMINOUS STARS IN THE NORTHERN MILKY WAY



APRIL 1982

NSSDC/WDC-A-R&S 82-12

DOCUMENTATION FOR THE MACHINE-READABLE VERSION

OF

LUMINOUS STARS IN THE NORTHERN MILKY WAY

Wayne H. Warren Jr.

April 1982

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

TABLE OF CONTENTS

LIST OF TABLES

SECTION 1 - INTRODUCTION

The *Luminous Stars in the Northern Milky Way (LSN)* is a series of catalogues resulting from a joint survey of the Hamburg and Warner and Swasey Observatories for early-type stars of high luminosity. This survey was conducted using objective-prism plates taken with the Schmidt telescopes of the Hamburg, Warner and Swasey, and University of Michigan Observatories and is contained in a series of six catalogues published in the period 1959 to 1965 (see source references below).

This document is intended to describe the machine-readable version of the catalogue, which contains all stars of the six source publications in a single file. In addition to the file containing the lists in order of their publication, a second file sorted by right ascension and a third file containing the remarks published in volumes II, IV and VI are included in the computerized catalogue. For additional details regarding the program, instrumentation, spectral classification, and determinations of magnitudes and positions, the source publications should be consulted. A copy of this document should be distributed with any machine-readable version of the catalogue.

SOURCE REFERENCES

Hardorp, J., Rohlfs, K., Slettebak, A. and Stock, J. 1959, *Luminous Stars in the Northern Milky Way* I. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Hardorp, J., Theile, I. and Voigt, H. H. 1964, *Luminous Stars in the Northern Milky Way* III. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Hardorp, J., Theile, I. and Voigt, H. H. 1965, *Luminous Stars in the Northern Milky Way* V. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Nassau, J. J., and Stephenson, C. B. 1963, *Luminous Stars in the Northern Milky Way* IV. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Nassau, J. J., Stephenson, C. B. and MacConnell, D. J. 1965, *Luminous Stars in the Northern Milky Way* VI. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Stock, J., Nassau, J. J. and Stephenson, C. B. 1960, *Luminous Stars in the Northern Milky Way* II. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

SECTION 2 - TAPE CONTENTS

Byte-by-byte descriptions of the data and remarks files of the *Luminous Stars in the Northern Milky Way* catalogue are given in Tables 1 and 2, respectively. The format of the right ascension ordered data file is identical to the first (published order) file. The suggested format specifications are given primarily for locating decimal points easily and are for FORTRAN formatted reads; they can be modified depending upon usage, but care must be exercised if substituting for character (A) formats since certain data fields contain blanks when data are not present. Unless indicated otherwise, a given field always has data in it. Alternate format specifications are given in parentheses.

Table 1. Tape Contents. *Luminous Stars in the Northern Milky Way*, Data Files

Byte(s)	Units	Suggested Format	Description
1- 7	---		*LSN* number in the form sign, zone, number within zone.
1	---	A1	Sign of zone.
2- 3	---	I2	Zone.
4- 7	---	I4	Sequential number within zone.
8	---	I1	Volume (1-6) of published catalogue in which the star is listed.
9-15	---	A7	Durchmusterung (always BD) number. Byte 9 contains the sign, 10-11 the zone, 12-15 the number. The field is blank when no BD number is present.
16	---	A1	Code for duplicity, e.g. P (primary or preceding), S (secondary), F (following), or remarks (?, 9 = BD and BD + 1 stars together).
17-33	---	17A1	or equivalent. Estimated spectral type. All characters are in upper case. For uncertain spectral types (enclosed in parentheses) the left parenthesis occurs in byte 17, e.g., it is possible to select all uncertain types by retrieving all stars having a "(" in byte 17. The types are uniform enough to allow a search of byte 18

Table 1. (continued)

Byte(s)	Units	Suggested Format	Description
			for all O, B, A,... stars, but the luminosity classes are not uniform. Plus and minus signs occur for their superscript counterparts and the following abbreviations are employed: CE - continuous emission near the Balmer limit LE - line emission, usually > 1 members of the Balmer series if not otherwise specified, observed on the blue plates H - H_α observed in emission R - reddened P - peculiar () - enclose uncertain information : - entire spectral type uncertain Exclamation points (!) can occur in the field. The W in Wolf-Rayet types is in byte 18. The entire field is blank when no data are given.
34-36	mag	F3.1 (A3)	Photographic magnitude. For some uncertain magnitudes (see byte 37), byte 36 is blank. The designation "VAR" in the published catalogues has been converted to "999" here. Field is blank if data are not present.
37	---	A1	A colon (:) for uncertain magnitude. A "V" indicates a visual magnitude (*Ptv*) taken from the *Henry Draper Catalogue*.
38-39	hours	I2	Right ascension (α) 1950.
40-41	min		α
42-44	sec	F3.1	α. Fields with "," in published catalogues have been converted to integer seconds, whereupon byte 44 is blank.

Table 1. (continued).

Byte(s)	Units	Suggested Format	Description
45	---	1X	Blank.
46	---	A1	Sign of declination.
47-48	°	I2	Declination (δ) 1950.
49-50	'	I2	δ.
51-52	"	I2	δ. Fields with "," in published catalogues have been converted to integer arcseconds.
53	---	A1	Colon (:) for uncertain coordinates.
54-73		4A4	Remarks. Slit spectral classifications (mostly from Morgan, Code and Whitford 1955 and Hiltner 1956); Aitken double-star (ADS) identifications; variable-star names; "AGK2" if star occurs in that catalogue; number of a star included in the list of Brodskaya and Shajn (1958); miscellaneous short remarks. An "R" indicates a note in the remarks file.
74	---	A1	An asterisk (*) was used in the remarks field of volumes III and V of the published catalogues to indicate an AGK2 star. Those asterisks occur uniformly in this byte; otherwise blank.

Table 2. Tape Contents. *Luminous Stars in the Northern Milky Way*, Remarks File

Byte(s)	Description
1- 7	*LSN* number of the star, in the same form as the data file.
8- 9	Integer used to sequentially number remarks and as a sort field for ordering the remarks in any desired way while keeping all remarks about the same star in their proper order.
10-80	Remarks in upper and lower case characters.

SECTION 3 - TAPE CHARACTERISTICS

The information contained in Table 3 is sufficient for a user to describe the indigenous characteristics of the *LSN* files to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, tape density, and coding (EBCDIC, ASCII, etc.) is not included. These parameters should always be transmitted if secondary copies of the catalogue are supplied to other users or installations. Parameters relating to the three files of the catalogue are separated by commas.

Table 3. Tape Characteristics. *Luminous Stars in the Northern Milky Way*

NUMBER OF FILES	3
LOGICAL RECORD LENGTH	74, 74, 80
RECORD FORMAT	FB*
TOTAL NUMBER OF LOGICAL RECORDS	7390, 7390, 167

* Fixed block length (last block may be short)

SECTION 4 - REMARKS, MODIFICATIONS AND REFERENCES

The *LSN* catalogue was received on magnetic tape from the Centre de Données Stellaires, Strasbourg. As received, the single file had a logical record length of 83 bytes. The following modifications and additions were made to the catalogue at the Astronomical Data Center, NASA Goddard Space Flight Center:

1. Preceding zeroes were removed from the *LSN* number, BD number, and m_{pg} fields.

2. LSN number zones from -00° southward were coded 90, 91, ... These were changed to -00, -01, -02, ... to match the real zones. Signs were added to all *LSN* numbers and declination fields.

3. Uncertain spectral types (surrounded by parentheses) were shifted such that the "(" always occurs in byte 17 of the record.

4. The characters "VAR" in a few m_{pg} fields were changed to "999" so that the field can be read with a numerical format specification if desired.

5. General editing was performed on the remarks field to separate words, star names, etc., to correct punching errors (such as zero in O spectral types, misspellings, etc.), and to add R codes to records having remarks not indicated in the data file. Duplicate stars, indicated by I and II in the first column of volumes III and V) are denoted by VOL I and VOL II in remarks.

6. Commas in the coordinate fields to indicate lower accuracy were changed to seconds of time and arcseconds in right ascension and declination so that they will not interfere with numerical format specifications.

7. All ampersands (&) were converted to plus (+) signs. (They were present due to the creation of the file in an older character coding system.)

8. Bytes 74 to 82 of each record were found to be never used; hence, the asterisks in byte 83 of the original records were moved to byte 74 and the record length was shortened to 74 bytes.

9. The completed file was sorted by increasing right ascension and added to the catalogue as a second file.

10. The remarks published in Volumes II, IV and VI were computerized and added as the third file.

REFERENCES

Brodskaya, E. S., and Shajn, P. F. 1958, *Publ. Crimean Astrophys. Obs.* 20, 299.

Hardorp, J., Rohlfs, K., Slettebak, A. and Stock, J. 1959, *Luminous Stars in the Northern Milky Way* I. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Hardorp, J., Theile, I. and Voigt, H. H. 1964, *Luminous Stars in the Northern Milky Way* III. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Hardorp, J., Theile, I. and Voigt, H. H. 1965, *Luminous Stars in the Northern Milky Way* V. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Hiltner, W. A. 1956, *Astrophys. J. Suppl.* 2, 389.

Morgan, W. W., Code, A. D. and Whitford, A. E. 1955, *Astrophys. J. Suppl.* 2, 41.

Nassau, J. J., and Stephenson, C. B. 1963, *Luminous Stars in the Northern Milky Way* IV. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Nassau, J. J., Stephenson, C. B. and MacConnell, D. J. 1965, *Luminous Stars in the Northern Milky Way* VI. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

Stock, J., Nassau, J. J. and Stephenson, C. B. 1960, *Luminous Stars in the Northern Milky Way* II. (Hamburg-Bergedorf: Hamburger Sternwarte and Warner and Swasey Observatory).

SECTION 5 - SAMPLE LISTING

The sample listings given on the following pages contain logical data records exactly as they are recorded on the magnetic tape. A sample listing is shown for each file; each listing contains groups of records from the beginning and end of the file. The beginning of each record and bytes within the record are indicated by the column heading index (digits read vertically).

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

TAPE FILE NAME: LUM. STARS N.H.W., VOL.
RECORDS 1 TO 30
TAPE FILE 43
RECORD LENGTH 74 BYTES
INPUT VOLSER WHW008

```
C O L U M N                                                                                                          111111111111111
H E A D I N G          11111111112222222222333333333344444444445555555555666666666677777777778888888888999999999900000000001111
I N D E X     1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	1	+52	11+52 420	A7II	72	0140271	+523805	AGK2;
RECORD	2	+52	21+52 542	OB-CE	90	0210306	+525325	AGK2;
RECORD	3	+52	31+51 579	OB	76	0224343	+521933	AGK2;O9.5V
RECORD	4	+53	11+52 433	OBH	87	0142551	+532128	AGK2;
RECORD	5	+53	21+53 394	OB-	89	0146061	+533737	AGK2;
RECORD	6	+53	31+53 395	OB-	89	0146244	+534000	AGK2;
RECORD	7	+53	41+53 480	OB	68	0210283	+534053	AGK2;B0.5IV
RECORD	8	+54	11+54 373	OB-	90	0142550	+543034	AGK2;
RECORD	9	+54	21+54 396	OB-	56	0148413	+545403	AGK2;
RECORD	10	+54	31+54 404	OB-	99	0149527	+545241	B1III
RECORD	11	+54	41	OB-	104	0157204	+541417	
RECORD	12	+54	51+54 448S	OB(H)	86	0200267	+545252	AGK2;B1.5III
RECORD	13	+54	61+53 471	OB-	98	0208491	+542414	AGK2;
RECORD	14	+54	71+54 490	OB-	96	0210542	+544937	B1V
RECORD	15	+54	81+53 486	OB-(H)	77	0211281	+547357	AGK2;
RECORD	16	+54	91+54 541	OB-	98	0222271	+544700	
RECORD	17	+54	101+54 544	B8IAB	99	0222588	+544836	
RECORD	18	+54	111	OB-	127	0354202	+545039	
RECORD	19	+55	11+553051	OB	70	2353533	+554243	AGK2;B0IV
RECORD	20	+55	21+553057	OB(CE)	99	2355051	+553449	AGK2;
RECORD	21	+55	31+543082		48	2356277	+552836	AGK2;B1V
RECORD	22	+55	41	OB-	105	0001434	+553547	
RECORD	23	+55	51+54 3	OB	105	0006110	+552318	
RECORD	24	+55	61+55 21	A9I	77	0010216	+553451	AGK2;
RECORD	25	+55	71+55 27	GI	94	0011483	+555830	AGK2;
RECORD	26	+55	81	OB	129	0018102	+552605	
RECORD	27	+55	91	OB-	125	0022010	+553028	
RECORD	28	+55	101+55 216	OB-	72	0055100	+553317	AGK2;
RECORD	29	+55	111	OB-	129	0111474	+552446	
RECORD	30	+55	121+54 258		72	0114451	+551056	AGK2;B1V

LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: LUM. STARS N.H.W., VOL.
RECORDS 7361 TO 7390
TAPE FILE 43
RECORD LENGTH 74 BYTES
INPUT VOLSER WHW008

```
C O L U M N                                                                                                                        1111111111111111
H E A D I N G             11111111112222222222333333333344444444445555555555666666666677777777778888888888999999999900000000001111111
I N D E X        12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD  7361  +13   26+131026  OB                 78 0551547 +135047
RECORD  7362  +13   36+131124  OB                 62 0605400 +135843:ADS4728AB
RECORD  7363  +13   46         OB                108 0607122 +130752
RECORD  7364  +13   56+131147  OB-                66 0607576 +134017
RECORD  7365  +13   66         OB                112 0607590 +131141
RECORD  7366  +13   76+131148  OB                106 0608168 +130925
RECORD  7367  +13   86+131158  B9IA               74 0609240 +134159
RECORD  7368  +13   96+131173  OB-                55 0612183 +135204:HB2222;B
RECORD  7369  +13  106+131181  OB-               105 0613339 +131947
RECORD  7370  +13  116+131182  OB                 95 0614034 +133136
RECORD  7371  +13  125+131196  B0IA               74 0616328 +130044
RECORD  7372  +13  136+131247  F3II              100 0623427 +130629
RECORD  7373  +13  146         B0II              110 0631323 +132726
RECORD  7374  +13  156+131342  OB-               102 0635522 +134506
RECORD  7375  +13  166+131395  B0IAB              79 0642253 +132316
RECORD  7376  +14   16+14 965  A0IB               86 0535159 +142146
RECORD  7377  +14   26+141106  OB-                93 0557224 +140820
RECORD  7378  +14   36+141192  OB-               102 0609536 +142834
RECORD  7379  +14   46         OBH               118 0615436 +144007
RECORD  7380  +14   56         OB                112 0615599 +143201
RECORD  7381  +14   66+141258  B8IB-II            82 0619081 +142004
RECORD  7382  +14   76+141296  OB+                62 0624246 +145507:
RECORD  7383  +15   16+15 853  F3II               94 0530362 +153420
RECORD  7384  +15   26+15 959  F2II               98 0549097 +150339
RECORD  7385  +15   36+151079  OB                 83 0606034 +154254
RECORD  7386  +15   46+151091  OB-               103 0607527 +153515
RECORD  7387  +15   56+151105  B9II              100 0609185 +153554
RECORD  7388  +15   66+151152  OB-               112 0616408 +150038
RECORD  7389  +15   76+151176  OB-B               79 0620330 +150744 B
RECORD  7390  +15   86+151271  A0IB               90 0636577 +155012
```

ORIGINAL PAGE IS
OF POOR QUALITY

LISTING OF RECORDS FROM TAPE FILE

TAPE FILE NAME: LUM. STARS N.M.W., RA
RECORDS 1 TO 30
TAPE FILE 44
RECORD LENGTH 74 BYTES
INPUT VOLSER WHW008

COLUMN HEADING INDEX								
RECORD	1	+59	261	OB-	134	0000324	+595713	
RECORD	2	+63	311+622356	OB+	62	0000507	+632144	AGK2;B3IA
RECORD	3	+60	741	OB-	110	0000574	+605533	
RECORD	4	+60	751	OB	131	0000574	+604217	
RECORD	5	+60	761	OB-	122	0001095	+604323	
RECORD	6	+60	771+602663	OBCE	89	0001223	+604931	AGK2;B0IBP
RECORD	7	+60	781+602664	OB-	102	0001277	+603409	
RECORD	8	+63	321+632099	A6II	107	0001279	+635757	
RECORD	9	+61	1211+612585	OB+(CE)	77	0001285	+615637	AGK2;OBP
RECORD	10	+63	331	OB-	123	0001331	+630017	
RECORD	11	+63	341	F5I	115	0001358	+631712	
RECORD	12	+62	611+612586	A1II	58	0001383	+620034	AGK2;
RECORD	13	+59	271+592824	OB(CE)	86	0001401	+595236	AGK2;
RECORD	14	+66	41	OB+R	119	0001406	+660409	
RECORD	15	+55	41	OB-	105	0001434	+553547	
RECORD	16	+62	621	OB-	123	0001460	+624708	
RECORD	17	+62	631	OB-(H)	116	0001498	+624633	
RECORD	18	+60	791	OB-	115	0001514	+601305	
RECORD	19	+64	141	OB	135	0001540	+642500	
RECORD	20	+62	641	OB-	134	0001544	+624258	
RECORD	21	+60	801	OB-	112	0001556	+605806	
RECORD	22	+63	351	B9II	108	0001584	+631547	
RECORD	23	+61	1221	OB	112	0002063	+611316	
RECORD	24	+60	811	OB-	110	0002069	+601849	
RECORD	25	+59	281	F8I	110	0002072	+595724	
RECORD	26	+60	821	OB-	127	0002075	+603127	
RECORD	27	+67	121+671598	OB	94	0002126	+675438	AGK2;
RECORD	28	+63	361	OB-	113	0002252	+633251	
RECORD	29	+63	371+632105	A7II	98	0002577	+633220	AGK2;
RECORD	30	+60	831	OB	129	0002579	+603312	

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

TAPE FILE NAME: LUM. STARS M.M.W., RA
RECORDS 7361 TO 7390
TAPE FILE 44
RECORD LENGTH 74 BYTES
INPUT VOLSER WHW008

```
C O L U M N                                                                                                   1111111111111111
H E A D I N G          111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111
I N D E X     1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
```

RECORD	7361	+61	1191+612581	OB-	99	2358256	+614812	
RECORD	7362	+64	71	OB-	114	2358346	+642037	
RECORD	7363	+58	81	OB+HI	117	2358351	+5[illegible] 210	
RECORD	7364	+64	81+641806	A2IB	105	2358376	+644259	
RECORD	7365	+64	91	OB	136	2358403	+641837	
RECORD	7366	+58	91	OB-	122	2358409	+585154	
RECORD	7367	+60	661+592810	OB-(CE),(H)	76	2358420	+600437	AGK2;WZ CAS
RECORD	7368	+64	101	OB-	121	2358593	+641403	
RECORD	7369	+63	281	OB-	124	2358593	+631607	
RECORD	7370	+64	111+632093P	OB-	105	2359010	+642042	AGK2;
RECORD	7371	+64	121	B8II	116	2359025	+640340	
RECORD	7372	+60	671+602657	A5II	60	2359030	+605640	AGK2;
RECORD	7373	+60	681+592813	OB-	81	2359047	+601018	AGK2;B1VN
RECORD	7374	+63	291	OBH	129	2359120	+631116	
RECORD	7375	+67	61+661673	OB+R	111	2359129	+671342	
RECORD	7376	+64	131	OB-	120	2359134	+641849	
RECORD	7377	+62	581	OB	114	2359321	+620738	
RECORD	7378	+67	71+661674	(OB)	95	2359359	+670903	AGK2;
RECORD	7379	+67	81+661675	OB	95	2359360	+670751	AGK2;07
RECORD	7380	+67	91+671674	OB	118	2359389	+670823	
RECORD	7381	+60	691	OB(H)	126	2359392	+600928	
RECORD	7382	+60	701	OB-	123	2359429	+605855	
RECORD	7383	+61	1201	OB-	122	2359442	+613557	
RECORD	7384	+67	101	OBR	119	2359456	+671743	
RECORD	7385	+63	301	OB-	130	2359469	+631130	
RECORD	7386	+62	591+622353	OB-	100	2359485	+623723	
RECORD	7387	+67	111	OB-	114	2359525	+672544	
RECORD	7388	+60	711	OB-	125	2359574	+601903	
RECORD	7389	+60	721	OB-	118	2359580	+605008	
RECORD	7390	+60	731	OB-	132	2359587	+605406	

ORIGINAL PAGE IS
OF POOR QUALITY

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

```
        TAPE FILE NAME: LUM. STARS N.M.W., NOTES
               RECORDS       1 TO      30
             TAPE FILE      45
          RECORD LENGTH     80 BYTES
           INPUT VOLSER    WHW000

C O L U M N                                                                                              111111111111111
H E A D I N G                 111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111
I N D E X           123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234

RECORD      1   +40    1 1May be B7 II.
RECORD      2   +39   47 1May be cA.
RECORD      3   +39   55 1ADS 14314AB.  The published delta m (Aitken, A New General Catalogue
RECORD      4   +39   55 2of Double Stars Within 120 deg of the North Pole) is so large that
RECORD      5   +39   55 3the observed spectrum must actually be entirely that of the primary.
RECORD      6   +39   55 4The primary is said to be composite in the Henry Draper Catalogue,
RECORD      7   +39   55 5and for this reason the star is given two HD numbers, HD 198287/8.
RECORD      8   +39   55 6The spectrum does not appear composite on our plates, and was charac-
RECORD      9   +39   55 7terized by Hynek (Perkins Contribution 1, No. 10, 1938) as one simu-
RECORD     10   +39   55 8lating compositeness because of high luminosity.  This conclusion is
RECORD     11   +39   55 9almost certainly correct.
RECORD     12   +38   17 1May be B6 Ia.
RECORD     13   +38   83 1May be B7 Ib.
RECORD     14   +37   35 1May be B8 II.
RECORD     15   +37   72 1May be B7 Ie.
RECORD     16   +36    0 1May be B7 II.
RECORD     17   +36   11 1May be cA.
RECORD     18   +36   86 1ADS 14724A.
RECORD     19   +35   33 1ADS 13374A.
RECORD     20   +35   61 1May be B9 II.
RECORD     21   +35   73 1May be cA.
RECORD     22   +34   12 1May be B8 Ib.
RECORD     23   +32   15 1ADS 13335A.
RECORD     24   +31    1 1H-beta in emission.
RECORD     25   +31   15 1The type given here is purely descriptive; among the grounds for
RECORD     26   +31   15 2doubting it is the fact that the spectrum shows no reddening despite
RECORD     27   +31   15 3its low Galactic latitude.  On the plate covering its position, an
RECORD     28   +31   15 4absorption feature which may be H-gamma is strong, while all other
RECORD     29   +31   15 5features, including the Balmer discontinuity, are at the limit of
RECORD     30   +31   15 6visibility.
```

L I S T I N G   O F   R E C O R D S   F R O M   T A P E   F I L E

```
TAPE FILE NAME: LOW. STARS N.H.W., NOTES
       RECORDS      138 TO     167
     TAPE FILE       45
 RECORD LENGTH       80 BYTES
  INPUT VOLSER     WHW008

C O L U M N                                                                                                1111111111111111
H E A D I N G          111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111
I N D E X      1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345

RECORD   138  -07  17 1Composite?
RECORD   139  -07  18 1May be B7 II-III.
RECORD   140  -07  24 1May be B8 II-III.
RECORD   141  -07  31 1Flat continuum.
RECORD   142  -08  27 1K-line visible?
RECORD   143  -08  29 1K-line visible?
RECORD   144  -09   7 1Ultraviolet continuum weak.
RECORD   145  -09  10 1May be B7 II.
RECORD   146  -09  11 1Lambda 4686 emission?
RECORD   147  -09  29 1K-line visible?
RECORD   148  -10  11 1ADS 11414A; component B may be A- type.
RECORD   149  -10  15 1May be B7 II-III.
RECORD   150  -10  16 1May be B7 II.
RECORD   151  -10  18 1Composite?
RECORD   152  -10  24 1ADS 11670AB.
RECORD   153  -10  29 1Flat continuum.
RECORD   154  -11  14 1Roberts 85.
RECORD   155  -11  15 1Spectral appearance differs considerably between two plates; may be
RECORD   156  -11  15 2less luminous than OB-.
RECORD   157  -11  20 1Of?
RECORD   158  -11  33 1May be B7 II.
RECORD   159  -12   5 1The published spectral type is taken form Hiltner, but does not check
RECORD   160  -12   5 2with the star's appearance on our plates.
RECORD   161  -12  56 1May be composite.
RECORD   162  -12  59 1Classified only from an H-alpha plate.
RECORD   163  -13  16 1Close pair, both OB stars, originally classified as one star.  The
RECORD   164  -13  16 2magnitude refers to the combined light.
RECORD   165  -13  40 1Roberts 86.
RECORD   166  -13  71 1May be composite.
RECORD   167  -14  56 1Roberts 87.
```